

1. What is R studio?

R studio = IDE for R (simple and user-friendly)

- memory up - export plot - import datasets - manage script - create command etc.

3. Getting started with R.

① `x <- 11` ② `y <- 7` * くりかえして上書きされる

`> print(x)` `> y` * 消した反応はない

`> xx <- " ~ "`

`> yy <- " 1 "`

a word
or number

* incomplete command は + が出る

* 上下のキーを押すと前後のコマンドが表示される

* # のあとは無視される

4. Create and Work with Vectors and Matrices in R

• vector → c (concatenate) を使う

ex. `> x1 <- c(1, 3, 5, 7, 9)`

`> x1`

`> [1] 1 3 5 7 9`

`> rep(1, times = 10)`

`> [1] 1 1 1 1 1 1 1 1 1 1`

`> rep("marin", times = 5)`

ex. `> gender <- c("male", "female")`

`> 2 = 7`

`> seq(from = 1, to = 7, by = 1)`

`> rep(1:3, times = 5)`

`> rep(seq(from = 2, to = 5, by = 1), times = 5)`

`> rep(c("m", "f"), times = 5)`

• 2つのベクトルが同じ長さなら、対応した位置の数字等の要素を + × ÷ できる

• ベクトルの中の一つを抽出

ex. `y = 1:5`

`y[3]` と `y[3]` が出る / `y[-3]` ⇒ 1, 2, 4, 5 / `y[1:3]` ⇒ 1, 2, 3

`y[c(1, 5)]` ⇒ 1, 5 / `y[-c(1, 5)]` ⇒ 2, 3, 4

`y[y < 2.5]` ⇒ 1, 2

• matrix

`> mat = matrix(c(1, 2, 3, 4, 5, 6, 7, 8, 9), nrow = 3, byrow = TRUE)`

⇒ rowwise fashion

`[1,]` `[1]` `[2]` `[3]`

1 2 3

`[2,]` 4 5 6

`[3,]` 7 8 9

column-wise fashion

1 4 7

2 5 8

3 6 9

⇒
FALSE
に気づく

`> mat` ↗ すべて出る

`> mat[1, 2]` ⇒ 2 / `> mat[c(1, 3), 2]` ⇒ 2, 8 / `> mat[2,]` ⇒ 4 5 6

`> mat[1, 1]` ⇒ 1 4 7 / `> mat * 10`

5. Import Data, Copy Data from Excel to R

* have the data file as ① .csv ② .txt better.

⇒ 在 R 中 excel 数据读入 (?)

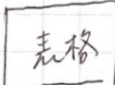
> help(read.csv)

> ? read.csv

(CSV) > data1 <- read.csv(file.choose(), header = TRUE)

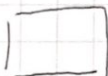
⇒ 在 R 中 window 中打开文件选择

> data1

> 

(CSV) > data2 <- read.table(file.choose(), header = T, sep = ",")

> data2

> 

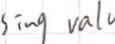

(txt) > data3 <- read.delim(file.choose(), header = T)

> data4 <- read.table(file.choose(), header = T, sep = "\t")

5. Using R studio to import excel data into R

① .xlsx ② .xls

file → import dataset → excel 数据 → browse → 选择 → import

* missing value =  空白 or  ⇒ NA のように
どう表示するか入力できる

code preview を見る

→ 新しいファイルで開く → コードを実行 → reimport

6. Export Data from R

• write.table を使う

write.table(DataToExport, file = "Exported File Name.csv", sep = ",")

↓ データ

↓ ファイル名

row.names = F

current working directory に注意

file = "/Users/ / / / ExportedFileName.csv",
name of path to new folder



• write.csv → sep = ";" (タブ区切り)

• write.csv2

7. Import, check & work with data in R

> help(read.table) データを読み込む

> ?read.table

Way ①

> Data1 <- read.table(file = "データの位置", header = TRUE, sep = "\t")

Way ②

PP1 > Data2 <- read.table(file.choose(), header = T, sep = "\t")

Way ③

TP1 only for R studio Import dataset → from Text File → select quote → character を何で示すか

> dim(データ名) → [1] 725 6 → head(データ名) 最初6列
↳ numbers of rows & columns → tail(データ名) 最後6列) subset of data

> データ名[c(5, 6, 7, 8, 9),] → names(データ名)
[5:9,] → 性質の名前が現れる (Age, Height etc.)
[-(4:722),] (variable)

AV

8. Import, check, work with data with R

CO1 X > mean(Age) specify & extract data in "Age" variable) ① extract data
O > mean(データ名\$Age) specific

g

② attaching data

> attach(データ名) ↔ > detach(データ名)
↳ そのまま使える (①のやり方がいい)

> class(Variableの名前)

> levels(variableの名前)

> "numeric" "integer" "factor"

> "yes" "no" etc "female" "male"
"0" "1"

> summary(データ名)

> x <- c(0, 1, 1, 1, 0, 0, 0, 0, 0) → > x <- as.factor(x)

> class(x)

> class(x)

> "numeric"

> "factor"

> summary(x) → min
median
max

> summary(x) → frequency = 0 1
7 3

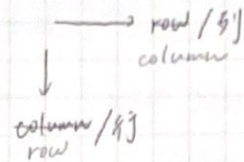
app

11

12

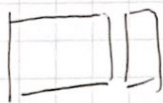
9. Subsetting Data in R with Square Brackets

```
> mean(Age[Gender == "female"])
> FemData <- f[1:nrow(f)[Gender == "female", ]
> MaleOver15 <- f[1:nrow(f)[Gender == "male" & Age > 15, ]
```



10. Logic Statement, cbind and rbind Functions

```
> Age[1:5]
> 6 18 16 14 5
> temp <- Age > 15
> temp[1:5]
> F T T F L
> temp2 <- as.numeric(Age > 15)
>
> [1] 0 1 1 0 0
> FemSmoke <- Gender == "female" & Smoke == "yes"
>
> [1] F T F F F
> MoreData <- cbind(f[1:nrow(f), FemSmoke])
```



column-bind
fashion

```
> rm(list = ls()) = Workspace 清除
```

11. Setting Up Working Directory in R

Session → Set WP → Choose Directory

```
> getwd()
> setwd( )
> projectWP( )
> setwd(projectWP)
```

12. Writing Scripts in R

tab → 可能好 1-9-を 表示 する 中 3

13. Installing Packages in R

```
> install.packages("epiR") (1) 1は 1つ だけ 全部 外 して 中 3
```

```
> selection = (A) 部分 の 地域 番号
```

```
> remove.packages( )
```


14. Customizing the Look of R studio

Tools → Options

15. Apply Function in R

? apply

apply (X, MARGIN, FUN, ...)

1 = row
2 = column
the object

function we want to apply

other arguments to send to function

ex. apply (X = StockData, MARGIN = 2, FUN = mean)

sum
plot, type = "l"

max

mean 計算するときは NA を除くという = 4

na.rm = TRUE

//

Avg 計算

colMeans (StockData, na.rm = TRUE) rowMeans () もあり

column mean 計算

apply (X = StockData, MARGIN = 2, FUN = quantile, probs = c(0.2, 0.8), na.rm = TRUE;
calculate percentile

which percentile to calculate

, FUN = plot, type = "l", main = "stock", ylab = "Price",
xlab = "Day")

points (apply (X = StockData, MARGIN = 1, FUN = sum, na.rm = TRUE),
pch = 16, col = "blue").

16. tApply Function in R

apply a function to subsets of variable or vector

tapply (X, INDEX, FUN = NULL, ..., simplify = TRUE)

grouping variable

same length with X

to create subsets of data

tapply (X = Age, INDEX = Smoke, FUN = Mean, na.rm = T) ○ list 形式

m =

平均の結果

mean (Age [Smoke == "yes"])

"no" 含む

simplify = FALSE

⇒ list format rather than a simple vector

tapply (Age, Smoke, summary)

, quantile, probs = c(0.2, 0.8))

by

(X = Age, INDEX = list (Smoke, Gender), FUN = mean, na.rm = T)

↳ mean (Age [Smoke == "no" & Gender == "female"])
"yes" "male"